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The atlas of Morocco, by M. de Foucauld, is a most valuable addition to the geography of the north of Africa. The lines of mountains and rivers shown on previous maps are here considerably modified. The Atlas range in Morocco is composed of three parallel chains instead of one, and the course of the Dra is found to be in its upper part half a degree to the west of its previously supposed position.

Captain Pleigmeur, who was commissioned to study the levels across the French African territory, between the Atlantic Ocean and Stanley Pool, was drowned in the River Niari.

The Northwestern African Trading Company, which succeeded to the rights of Mr. Mackenzie at Cape Juby, near the frontier of Morocco and opposite to the Canary Islands, imposes a duty of from ten to twenty per cent. upon merchandise going into Morocco. The factory of this company was recently attacked by the natives, and the director, M. Morris, was assassinated.

In May, 1888, news was received from Cairo respecting Lupton, Slatin, and the other prisoners of the Mahdi. Their situation is the most miserable possible, they are condemned to the hardest and most humiliating tasks. To negotiate for their release would be trouble lost, to organize an expedition would be to hasten their death. None the less it is a shame to leave Europeans in this deplorable condition.

GEOLOGY AND PALÆONTOLOGY.

Description of New Species of Fossils from the Rockford Shales of Iowa.—Professor Newberry, in speaking of the mingling of the Devonian fauna of Ohio,[1] says: "The mingling of the fauna of the Hamilton and Corniferous is apparently somewhat greater here than in New York, but this is readily explained by the fact that here, as in other portions of the Western States (Iowa included), there were no such striking alternations of conditions during the successive deposition of strata as are indicated at the east.

"An open sea prevailed throughout several successive pericds at the west, and during these an unbroken series of limestone strata was formed, while at the east alternating shore and off-shore conditions interposed sheets of mechanical sediment, and gave more distinctness to the fauna of each formation."

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[1] Geology of Ohio, Vol. I., p. 144.

Now, however applicable these statements may be to the Devonian rocks of other States, they certainly are not, to any such degree, applicable to the rocks of this age in Iowa. The Devonian rocks of this State, as observed by Dr. White,[1] are *serially isolated.*

The occurrence of extensive beds of very coarse and fine-grained sandstone, varying from five feet to forty feet in thickness (sometimes obliquely and discordently stratified throughout), and blue and buff shales, some of which are extensively sun-cracked, and others containing abundant remains of land plants, as well as extensive beds of blue clay and hard, fine-grained and compact limestone, and the varying fauna of the several divisions, all attest that there were nearly equally as striking alternation of conditions during the successive deposition of strata in Iowa as are indicated "at the east;" and that the *alternating shore and off-shore conditions which* interposed sheets of chemical and mechanical sediment, have, to a greater or less degree, given a distinctness to the fauna of the several divisions equal to that "of the east."

An interesting and instructive feature of the exceedingly rich fauna of the Rockford Shales of Iowa is the extreme minuteness of a considerable number of its fossil species. Of these minutissimic, yet adult, forms, more than fifteen are Gastropoda, four Brachiopoda, three Crustaceans, four or five Foraminifers (suborder Perforata), and five or six small Bryozoan corals. These forms, which comprise slightly over one-seventh of all those known to occur in this formation, are usually well represented both as to genera, species and individuals.

The organic life of the old Devonian sea in Iowa culminated in these shales; and at this time was ushered in a period when the conditions were much more favorable to the existence of life than at any other epoch of the Devonian age in this State. Immediately underlying the Rockford Shales is a stratum of dark blue clay from twenty feet to twenty-five feet in thickness, and entirely destitute of organic remains; this attesting conditions, when the material was laid down, *extremely unfavorable to the existence of* any form of life. Upon the ushering in of conditions under which the material of the super-incumbent shales was deposited, the change from the pre-existing conditions was very abrupt.[2]

Although the change in the character of deposition here was very sudden, yet the change as to congeniality to life seems not to have been so rapid, as appears to be attested by the fact that nearly all the depauperate forms above enumerated occur at the *base* of these shales.

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[1] White's Geology of Iowa, 1870.

[2] There are nowhere beds of passage from the blue clay below to the shales above, the change having been everywhere very rapid and sharply defined.

But that conditions eminently favorable to the existence of life finally took place, is demonstrated by the fact that from a few feet above the base of the formation to the top of it, the strata is crowded to repletion with various normal, and often large, forms of life.

As will be observed by the enumeration, Brachiopods form but an inconspicuous feature of the fauna at the base of the shales; while the fauna of the higher horizons of this formation shows a preponderance, both as to numbers of species and individuals, of this class of organic remains.

In general, the different classes of fossil remains, as Brachiopoda, Gastropoda, Crustaceans, etc., are restricted in their vertical range to certain definite horizons, and so do not occur in equal force throughout the entire formation.

This paper, together with others published and in press, are preliminary to a Monograph on the Devonian formation of Iowa.

Rhynchonella subacuminata, n. sp.—Shell somewhat variable; sub-triangular in marginal outline; greatest width above the centre of the shell; contracting quite rapidly to the front, where it terminates in three sharp angles, which are produced by the sharply angular folds on the front of the valves. Dorsal valve strongly convex in the centre; furnished with three prominent sharply angular folds at the front, which usually become obsolete before reaching the centre of the shell; sinus, large, deep, and broadly rounded; margined in front by from two to three sharp, short folds; front and cardinal margins sharply serrate. Surface of shell smooth; texture fibrous. In the young specimens of this species, folds or elevations are not present on any portion of the shell.

Position and locality: Rockford Shales, Hackberry, Cerro Gordo county, Iowa.

Athyris minutissima, n. sp.—Shell minute; subovate in outline; valves strongly and nearly evenly convex; greatest convexity above the middle; cardinal margins sloping rapidly to slightly below the centre, thence rather broadly curving to the front. Ventral valve slightly more convex than the dorsal valve; umbo prominent; beak sharp, and incurved over the beak of the opposite valve. Dorsal valve slightly less convex than the opposite valve; umbonal region strongly convex. Surface marked by strong equi-distant imbricating lines. Neither valve has an elevation or depression at the front that would correspond to a mesial fold or sinus.

Dimensions: length, 2¾ mm.; greatest width, 2 mm.

Position and locality: lower portion of Rockford Shales, Rockford, Floyd county, Iowa.

Paracyclas validalinea, n. sp.—Shell rather large, oblong, subcircular in marginal outline; length and breadth usually unequal; dorsolateral portion of the shell strongly produced. Valves ventricose; most strongly so at or slightly above the centre; cardinal line strongly arcuate; beaks prominent and strongly curving forward, distant, situated centrally or very nearly so. Muscle impressions large, and in well preserved specimens distinctly marked; the posterior one sub-circular; the anterior one obliquely subreniform, and considerably smaller than the posterior one. Pallial line prominent, parallel to which is a prominent row of pustules arranged side by side. Surface unknown.

This shell differs from any form previously described that is known to me. This form is known only by its cast, of which over one hundred specimens have been secured.

Position and locality: Rockford Shales, Rockford, Hackberry, and Owens' Grove, Iowa.

Platystoma mirus, n. sp.—Shell very minute; suborbicular in outline; spire nearly on a plane with the body whorl; volutions about three. Outer volution large, strongly convex, rounded; suture not very distinct; aperture sub-circular; outer lip of moderate thickness with entire margin; columella lip not distinctly produced; umbilicus closed. Surface smooth.

Dimensions: diameter, 1 mm.; height, $\frac{3}{5}$ mm.

Position and locality: lower portion of Rockford Shales, Hackberry, Iowa.

Platystoma pervetus, n. sp.—Shell semi-circular to subovate in outline; spire elevated but little above the body whorl; volutions about three; the body volution very large, rounded, and very convex; suture well defined; aperture sub-circular; umbilicus deep. Surface smooth.

Dimensions: greatest diameter, $\frac{3}{4}$ mm. to 1 mm.; vertical height, $\frac{3}{4}$ mm. to $\frac{1}{2}$ mm.

Position and locality: lower part of Rockford Shales, Hackberry, Iowa.

Naticopsis rarus, n. sp.—Shell somewhat subovate in general outline; spire slightly prominent, depressed; volutions three; convex, rounded; increasing rather rapidly in size from the apex; body whorl large, forming by far the greater bulk of the entire shell; broadly rounded on the sides. Suture distinct; aperture subovate; outer lip thick; inner lip not defined. Surface smooth.

Dimensions: height, $1\frac{1}{2}$ mm.; greatest breadth, $1\frac{1}{5}$ mm.

Position and locality: base of Rockford Shales, Hackberry, Iowa.

Turbo strigillata, n. sp.—Shell turbiniform, thick; spire depressed, conical; whorls four, increasing rapidly in size from the apex; those of the spire convex, but not distinctly rounded; last one large, strongly inflated; lower portion rounded; upper surface somewhat flattened, and marked by a distinct revolving groove or depression, which becomes obsolete on the second volution, or almost before reaching it. Suture from nearly linear at the apex, to comparatively deeply channeled below; aperture orbicular; outer lip thick, entire; columella lip very thick, especially the lower portion. Surface of body volution ornamented by strong sub-equidistant, oblique, sinuous lines.

Dimensions: vertical height, 2 mm.; greatest width, 2 mm.

Position and locality: base of Rockford Shales, Hackberry, Iowa.

Turbo (?) *incertus*, n. sp.—Shell conical, turbiniform, comparatively thick; volutions four, moderately increasing in size; the upper ones convex, but little rounded; the last one large, and somewhat more rounded than the upper ones; the second whorl has also a slightly more curved outline than the two upper ones; suture well defined; aperture imperfect, but apparently discoid. Surface marked by simple straight lines.

Dimensions: vertical height, 2¾ mm.; diameter at base, 1¾ mm.

Position and locality: base of Rockford Shales, Hackberry, Iowa.

Holopea tenuicarinata, n. sp.—Shell thick, small, sub-coniform; spire rather rapidly tapering; volutions four, convex, flattened above; the body whorl ventricose, rounded, nearly or quite equal in height to all of the others; slightly produced in front. Exact form of the aperture unknown, but judging from the portion which remains unbroken, it was subovate in outline; the portion of the outer lip which remains is thick. Suture sublinear above, and slightly channeled below. Surface ornamented by rather obscure, oblique, curved lines.

Dimensions: height, 2 mm.; greatest width, 1 mm.

Position and locality: base of Rockford Shales, Hackberry, Iowa.

Cyclonema brevilineata, n. sp.—Shell turbonate; rather thin; spire strongly depressed, conical; volutions three, increasing quite rapidly in size; those of the spire convex, rounded; last one large, somewhat more broadly rounded than the upper ones; upper surface very slightly flattened; suture well defined below, but not so distinctly defined above. Aperture ovate to sub-circular. Surface of body whorl marked by strong revolving lines or ridges, which become obsolete (except in the case of one specimen) on the second volution; interstices about equal to the width of the revolving ridges; surface of the upper volutions smooth. The revolving lines on the first turn show, under a strong magnifier, a more or less strong crenate character, though not caused by lines of growth.

Dimensions: greatest width, 1½ mm.; vertical height, 1 mm.

We have in our cabinet many specimens of this species, all of the same form and size, and showing (with the single exception noted) the same surface marking.

Position and locality: base of Rockford Shales, Rockford and Hackberry, Iowa.

Cyclonema subcrenulata, n. sp.—Shell small, sub-turbonate; spire depressed, sub-conical; volutions three, increasing rapidly in size from the apex; those of the spire slightly convex, flattened; last one large, equal to two-thirds the bulk of the entire shell, convex, flattened, or very broadly rounded; rounded at the periphery; suture well defined; aperture oblong-ovate. Surface ornamented by strong, sharply elevated, revolving ridges, which are distinctly crenated by the strong, slightly oblique lines of growth.

Of these revolving lines, fifteen may be counted on the body volution in close proximity to the periphery, three of which are very minute, and implanted between the main ridges; these are rather short, as well as one of the main ones which joins the suture.

On the upper portion of the body whorl, between the suture and the first revolving line, is a flattened or slightly concave space, which is marked by stronger and more oblique striæ than other portions of the surface of the shell; on the whorl next above the body volution, four revolving lines may be counted.

This species seems to be somewhat closely related to *C. crenulata* of Meek (*Geological Survey of Ohio, Palæontology*, Vol. I., p. 213, Plate XIX., Fig. 2, a, d), but differs from it in its more strongly depressed form, less number of volutions, and slightly different form of the aperture; it also has a less number of revolving lines (three of which are minute and implanted), and a more profound crenate character, as well as the distinct belt or flattened area occupying the upper part of the first volution.

Dimensions: height, 11½ mm.; greatest width, 11½ mm.

Position and locality: lower portion of Rockford Shales, Rockford, Iowa.—*Clement L. Webster.*

HANDBUCH DER PALÆONTOLOGIE OF ZITTEL.[1]—We welcome another installment of this excellent work, which carries the subject to the end of the Batrachia from the Actinopterygia, mostly inclusive. We have already indicated our dissent from the classification of the fishes adopted, but the very full references to the literature of the subject in this work furnish the alternatives to the student We notice some typographical errors (as Ganorhynchus for Gonorhynchus, and Scyllæmus for Syllæmus), and a few errors of nomenclature of no great importance. An error once started, often has a strong vitality, as in the case of the name Daptinus Cope, which I long since showed is the Saurodon of Hays, of much prior date; and Protosphyræna Leidy, which, if it be used at all, belongs to the species *P. striata,* and not to the genus Erisichthe Cope. The name Saurodontidæ Cope should not be replaced by Saurocephalidæ of later origin, because Saurodontidæ Zittel, of later date than either, has been applied to another family, which should, if well defined, have another name.

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[1] Unter Mitwirkung von Dr. A. Schenk. Palæozoölogie; III Bd., 25 lieferung; 154 Holzschnitten. Teleostei (finis) et Batrachia.

In the Batrachia, Professor Zittel divides the Stegocephali into three primary groups, the Lepospondyli, Temnospondyli, and Stereospondyli. In the first the vertebral centra consist of a simple sheath round the chorda dorsalis; in the second the centra are segmented; and in the third they are amphicœlous and "completely ossified." The author does not adopt the divisions Ganocephala, Rhachitomi, and Embolomeri. There are serious objections to the system proposed by Prof. Zittel, which I will state. There does not seem to be any real difference between the Lepospondyli and the Stereospondyli, since a tubular vertebral centrum passes by the most insensible gradations into an amphicœlous one. The Temnospondyli cannot be regarded as homogeneous, or exactly defined. In fact, the vertebral centra of the Embolomera are not segmented, but are as entire as in the other two divisions of Zittel. The presence or absence of two occipital condyles is also a character not to be neglected in this connection.

The account of the Stegocephali (including Ganocephala, Rhachitomi, and Embolomeri) is the most complete ever placed in the hands of students; in fact it is the *only* synopsis yet published. In the midst of this important monograph we are compelled to make two corrections. The lettering of the pelvis of Eryops (p. 364) is reversed in position. Secondly, the genus Stereorhachis Gaudry (p. 398) is not a Bratachian, but a reptile of the order Theromora, and probably of the family Clepsydropidæ.—*E. D. Cope.*

SCHLOSSER ON CARNIVORA.[1]—The second part of Dr. Schlosser's important memoir includes the lower Carnivora, or the Ursidæ, Canidæ, and Mustelidæ. It includes much that is new on the subject, and by its thoroughness and critical character advances our knowledge of the European forms much beyond any previous publication. A number of new genera are added, as Pachycynodon in Canidæ; Pseudamphicyon in Ursidæ; and in Mustelidæ, Plesiocyon, Haplogale, Stenogale, and Pseudictis. He includes in the latter family Proælurus Filh. and denies that it is allied to the Nimnavidæ or Felidæ. He redefines the Ursidæ (under the name Amphicyonidæ), so as to include besides Ursus and Hyænarctos,—

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[1] Die Affen, Lemur, Chiropteren, Insectivoren, Marsupialia, Creodonten u. Carnivoren des Europaischen Tertiärs; von Max Schlosser; 4 Tafeln; 4to. Alfred Hölder, Wien, 1888. II. Abtheilung.

Amphicyon, Dinocyon, Cephalogale, Simocyon, Oligobunis, and probably Enhydrocyon. In the Canidæ, Dr. Schlosser appears to us to admit too many genera; at least we cannot clearly make out generic differences from his descriptions. On the other hand the genera of Mustelidæ, though numerous, are sharply defined. We note a couple of errors in the matter of American species. *Canis brachypus* Cope is not an Eocene, but an upper Miocene species (Ticholeptus beds). *Aelurodon ferox* and *Canis saevus* cannot be well referred to different families, as they were established on the superior and inferior molars of the same species. Four plates accompany this memoir.—*E. D. Cope.*

MINERALOGY AND PETROGRAPHY.[1]

PETROGRAPHICAL NEWS.—There have recently appeared two interesting papers upon the Cortlandt series of eruptive rocks, and the changes they produce in the surrounding mica-schists and limestones. The first paper is by Mr. J. F. Kemp,[2] who reports the results of his examinations of an extension of the series west of Stony Point, N. Y. He finds the eruptives to be of the same general character as those described by Dr. Williams,[3] from near Peekskill. In one of these he notices the alteration of brown hornblende into green augite. He further finds that limestone upon the contact with these eruptives has undergone an alteration, during the course of which tremolite has been developed. Dr. Williams's[4] paper deals with the contact phenomena observed in the rocks surrounding the eruptives in the Stony Point region. The unaltered mica-schists consist of quartz, biotite, muscovite, a little feldspar, tourmaline, and occasionally zircon. Upon approaching the eruptives they lose their foliation and have developed in them: garnet, sillimanite, staurolite, scapolite, cyanite, margarite, ripidolite and corundum. The *sillimanite* is found in radiating bundles of fibres. The *ripidolite* (or clinoclor) is derived from the biotite of the schists. The *margarite* has the macroscopic appearance of muscovite. In the thin section, it is distinguished from this mineral by its high refractive index, its extinction of 6°–10°, its numerous twins parallel to oP, and its large optical angle (114½° in air). Its composition is:—

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[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.
[2] Amer. Jour. Sci., Oct., 1888, p. 247.
[3] Cf. Amer. Naturalist, 1886, p. 275; 1887, p. 569.
[4] Amer. Jour. Sci., Oct., 1888, p. 254.